Health Consultation

Heavy Metals Confirmation Sampling

EL PASO COUNTY METAL SURVEY SITE
(a/k/a EL PASO METAL SURVEY SITE)

EL PASO, EL PASO COUNTY, TEXAS

Prepared by:

The Texas Department of Health
under a cooperative agreement with the
Agency for Toxic Substances and Disease Registry

BACKGROUND AND STATEMENT OF ISSUES

Recently, at the request of the U. S. Environmental Protection Agency (EPA), the Texas Department of Health (TDH) and the Agency for Toxic Substances and Disease Registry (ATSDR) reviewed data collected in the El Paso area by the Texas Air Control Board (predecessor of the Texas Natural Resource Conservation Commission [TNRCC]) in 1989 and data collected by four graduate students from the University of Texas at El Paso in 1993 and 1994. TDH concluded that under some theoretical exposure situations, the concentrations of lead and arsenic found in some of the soil samples could be considered unacceptable. Because of uncertainties associated with site-specific exposures, TDH categorized the contaminants found in the soil as posing an indeterminate public health hazard and recommended confirmation sampling to verify the results [1].[1] Confirmation soil samples were collected from various high public access areas in and around the El Paso, Texas and Sunland Park, New Mexico area during July of 2001. The EPA has asked TDH and ATSDR to review the confirmation soil sample results to determine whether and where more extensive sampling was needed to assess the public health significance of the contaminants found in the soil. The TDH and ATSDR have coordinated this evaluation with the New Mexico Border Health Office, Public Health Division, New Mexico Department of Health (NMDOH).

DISCUSSION

The environmental sampling data that we reviewed for this consultation were collected from various parks and schools in the El Paso, Texas/Sunland Park, New Mexico area. Although samples were collected at different depths, we only used the surface soil (0 to 1 inch) samples since they best represent the soil most readily available for exposure (Tables 1-3). EPA analyzed the samples as unsieved samples, #10 sieved samples, and #60 sieved samples. The #10 sieved samples exclude particles greater than approximately 2,000 microns (0.0787 inches) while the #60 sieved samples exclude particles greater than approximately 250 microns (0.0098 inches). The #60 sieved fraction generally is considered to be the fraction most likely to be ingested as soil and dust because the size of the soil particles in this fraction are those most likely to stick to hands, toys, and other objects [2]. The concentration of contaminants in the #60 sieved fraction is generally higher than in the unsieved fraction; however, in situations where contaminants are associated with coarser material the opposite situation may occur. While the #60 fraction is considered to be the most conservative fraction upon which to base public health decisions the possibility of future degradation of the contaminants in the unsieved fraction should not be ignored when considering the need for additional sampling. For this consultation we considered all the 0-1 inch samples.

---

[1]An in depth review of the historical work done in this area can be found in the July 20, 2001 health consultation (reference 1).

In addition to the confirmation soil sampling, EPA also collected air samples from various locations in the El Paso / Sunland Park area. Samples were analyzed for lead, arsenic, barium, cadmium, chromium, and selenium.

As stated in our previous consultation [1], we recognize that the unique vulnerabilities of children demand special attention. Windows of vulnerability (critical periods) exist during development, particularly during early gestation, but also throughout pregnancy, infancy, childhood and adolescence ---- periods when toxicants may permanently impair or alter structure and function [3]. Unique childhood vulnerabilities may be present because, at birth, many organs and body systems (including the lungs and the immune, endocrine, reproductive, and nervous systems) have not achieved structural or functional maturity. These organ systems continue to develop throughout childhood and adolescence. Children may exhibit differences in absorption, metabolism, storage, and excretion of toxicants, resulting in higher biologically-effective doses to target tissues. Depending on the affected media, they also may be more exposed than adults because of behavior patterns specific to children. In an effort to account for children's unique vulnerabilities, and in accordance with ATSDR's Child Health Initiative [4] and EPA's National Agenda to Protect Children's Health from Environmental Threats [5], we used the potential exposure of children to the contaminants found in the soil as a guide in assessing the need for additional sampling.

In preparing this report, we relied on the information provided and assumed adequate quality assurance/quality control (QA/QC) procedures were followed with regard to data collection, chain-of-custody, laboratory procedures, and data reporting. The analysis and conclusions in this report are valid only if the referenced information is valid and complete.

Soil Sample Results

Lead

To assess whether the concentrations of lead found in the soil indicate that more extensive sampling is warranted we used the CDC's definition of excessive lead absorption in children and the estimated relationship between blood lead in children and soil lead concentrations (EPA's integrated uptake biokinetic model) to derive a health-based assessment comparison (HAC) value for this contaminant. HAC values are guidelines that specify levels of chemicals in specific environmental media (soil, air, water) that are considered safe for human contact. In this instance, exceeding a health-based HAC value does not imply that the contaminant will cause harm but does suggest that further sampling may be needed to determine the public health significance of the lead in the soil.

Based on observations of enzymatic abnormalities in the red blood cells at blood lead levels below 25 :g/dL and observations of neurologic and cognitive dysfunction in children with blood lead levels from

10–15 :g/dL, the CDC has determined that a blood lead level $10 :g/dL in children indicates excessive lead absorption and constitutes the grounds for intervention [5]. The relationship between soil lead levels and blood lead levels is affected by factors such as the age of the population exposed to the contaminated soil, the physical availability of the contaminated soil, the bioavailability of the lead in the soil, and differences in individual behavioral patterns [6-8]. While there is no clear relationship applicable to all sites, a number of models have been developed to estimate the potential impact that soil lead could have on the blood lead levels in different populations [8-11]. In general, soil lead will have the greatest impact on the blood lead levels of preschool-age children. These children are more likely to play in dirt and to place their hands and other contaminated objects in their mouths, they are better at absorbing lead through the gastrointestinal tract than adults, and they are more likely to exhibit the types of nutritional deficiencies that facilitate the absorption of lead. For children, the predicted 95th percentile blood lead level associated with a soil lead concentration of 500 mg/kg is approximately 10 :g/dL. This means that except in the most extreme cases (i.e., frequent contact by children exhibiting pica behavior, or desire for unnatural foods such as dirt or ashes) children regularly exposed to soil lead levels of 500 mg/kg should have no more than a 5% probability of having blood lead levels greater than 10 :g/dL. Based on the goal of limiting the probability of exceeding a blood lead level of 10 :g/dL to no more than 5%, depending on individual exposure situations, the concentrations of lead in soil where children might have regular contact should be less than 500 mg/kg. As per EPA Office of Solid Waste and Emergency Response (OSWER) Directives, 400 mg/kg is used as a screening level to decide whether additional sampling is warranted [12, 13]. During investigative work, particularly where the sampling is limited, it is prudent and protective of public health to use a screening level below the cleanup goal to decide whether further characterization of the site is necessary.

In El Paso, the 400 mg/kg screening level for follow-up sampling was exceeded in Arroyo Park (in two of eight samples), Doniphan Park, El Paso Library (#60 sieved fraction), Vilas Elementary (unsieved fraction), El Paso High (unsieved fraction), Alamo Elementary (#60 sieved fraction), Roosevelt Elementary, and at various locations at the University of Texas at El Paso (the TNRCC Air Monitoring site, Memorial Triangle, Leech Grove, Union Lawn, northeast of the Education building, and at the soccer field swim and fitness center) (Table 1 and 2). In New Mexico, the 400 mg/kg screening level for follow-up sampling was exceeded at Mount Cristo Rey Park (one of three samples) and at the water tank at the intersection of McNutt and Racetrack (Table 3).

Arsenic

To assess the potential health risks associated with the arsenic in soil we compared the soil concentrations to health-based assessment comparison (HAC) values for non-cancer and cancer endpoints. The non-cancer HAC values for arsenic in soil (20 mg/kg for children and 200 mg/kg for adults) are based on EPA's reference dose (RfD) for arsenic of 0.3 :g/kg/day [14]. RfDs are based on the assumption that an there is an identifiable exposure threshold (both for the individual and for

populations) below which there are no observable adverse effects. Thus, the RfD is an estimate of a daily exposure to arsenic that is unlikely to cause adverse non-cancer health effects even if exposure were to occur for a lifetime. For arsenic, the RfD was derived by dividing the identified no observable adverse effects level (NOAEL[2]) of 0.8 :g/kg/day, obtained from human epidemiologic studies, by an uncertainty factor of three. The lowest observable adverse effects level (LOAEL[3]) associated with these epidemiologic studies was 14 :g/kg/day, where exposure to arsenic above this level resulted in hyperpigmentation of the skin, keratosis (patches of hardened skin), and possible vascular complications [14–16]. We used standard assumptions for body weight (70 kg adult and 15 kg child) and soil ingestion (100 mg per day for adults and 200 mg per day for a child) to calculate the HAC values.

EPA also classifies arsenic as a known human carcinogen based on sufficient evidence from human data. An increase in lung cancer mortality was observed in multiple human populations exposed primarily through inhalation. Also, increased mortality from multiple internal organ cancers (liver, kidney, lung, and bladder) and an increased incidence of skin cancer (non-malignant) were observed in populations consuming water high in inorganic arsenic [14]. The carcinogenic HAC value for arsenic of 0.5 mg/kg is based on EPA's cancer slope factor (CSF) for skin cancer and an estimated excess lifetime cancer risk of one cancer in 1 million (1×10^{-6}) people exposed for 70 years. Because background levels of arsenic in the United States exceed the carcinogenic HAC value [17] it would be inappropriate to use this value as a screen to determine whether and where additional samples should be taken. Since chronic exposure (everyday for 70 years) to soil containing arsenic at a concentration equivalent to the non-cancer HAC value (20 mg/kg) would result in no apparent increased lifetime risk for cancer, we used 20 mg/kg as the screening level for this contaminant.

In El Paso the screening value was exceeded at Arroyo Park (in six of the eight samples), Doniphan Park, El Paso Library, Mesita Elementary (in one of four samples), Vilas Elementary (in one of two samples), Roosevelt Elementary (in one of two samples), and at various locations at the University of Texas at El Paso (TNRCC Air Monitoring site, Memorial Triangle, Leech Grove, Union Lawn, northeast of the Education building, and at the soccer field swim and fitness center) (Tables 1 and 2). In New Mexico, the screening value was exceeded at Mt. Cristo Rey Park (in one of three samples) and at the intersection of McNutt and Racetrack (Table 3).

Unsieved Results Versus Sieved Results

For both lead (omitting two outlying samples; one from the University of Texas at El Paso near the

[2]The highest dose at which adverse effects were not observed.

[3]The lowest dose at which adverse effects were observed.

TNRCC Air Monitoring site and the other from El Paso High) and arsenic, there was a high correlation between the concentrations measured in the unsieved and #60 sieved fractions (R^2 = 0.95 and 0.94 for lead and arsenic, respectively) (Figures 1 and 2). On average, the concentrations of lead in the #60 fraction were 9 percent higher than those in the unsieved fraction. For arsenic, the concentrations were 21 percent higher in the #60 sieved fraction.

Air Sample Results

All the contaminants detected in the air samples were below their respective screening values (Table 4).

CONCLUSIONS

1. Based upon these data additional soil sampling is warranted at several locations in El Paso, Texas and Sunland Park, New Mexico. In Texas, additional sampling is warranted at Arroyo Park, Doniphan Park, El Paso Library, Mesita Elementary, Vilas Elementary, Roosevelt Elementary, and at various locations at the University of Texas at El Paso. In New Mexico, additional sampling is warranted at Mt. Cristo Rey Park and at the water tank at the intersection of McNutt and Racetrack. Sieving the samples through a #60 filter appears to result in slightly higher soil concentrations for both lead and arsenic.

2. At this time, the need for additional sampling should not be taken to indicate that any individual or group of individuals are unnecessarily at risk. The risk to any individual depends upon numerous factors including the amount of soil the individual eats, how often they eat the soil, over how many years they eat the soil, and the average concentration of the contaminants in the soil that they eat. More extensive knowledge of the distribution of the contaminants in the soil is needed to determine the potential public health threats associated with these contaminants.

3. Based on air sample results available for this report, at present, we would not expect the potential exposure to contaminants in the air to pose a public health hazard.

PUBLIC HEALTH ACTION PLAN

Actions Recommended

1. Grid sampling to better characterize the nature and extent of the contamination at the above-mentioned locations is recommended. One of the goals of these sampling efforts should be to establish credible exposure point concentrations to allow for a better determination of the public health hazards associated with these contaminants at each of the locations.

2. Use a #60 sieve on the samples to provide a more conservative basis upon which to determine the potential public health hazards associated with the contaminants in the soil.

3. TDH, NMDOH and ATSDR should be provided with the sample results so to determine the public health significance of the concentrations found in the soil.

Actions Planned

1. EPA is planning additional sampling of the identified areas.

2. EPA will provide TDH, NMDOH and ATSDR with the sample results so that they may prepare a health consultation to determine whether the concentrations found in the soil present a continuing threat to public health.

REFERENCES

1. Agency for Toxic Substances and Disease Registry. Health Consultation Review of historical soil sampling results El Paso County Metal Survey Site, El Paso, El Paso County, Texas. Texas Department of Health. July 20, 2001.

2. US Environmental Protection Agency. TRW Recommendations for Sampling and analysis of soil at lead [Pb] sites. Office of Emergency and Remdial Response (5204G). EPA-540-F-00-010 OSWER 9285.7-38. Guidance Document, April 2000.

3. US Environmental Protection Agency. 2000. Strategy for research on environmental risks to children. Washington, DC: US Environmental Protection Agency, Office of Research and Development. EPA/600/R-00/068, Section 1.2.

4. Agency for Toxic Substances and Disease Registry (ATSDR). Child health initiative. Atlanta: US Department of Health and Human Services; 1995.

5. US Environmental Protection Agency. The children's environmental health yearbook; 1998.

6. Centers for Disease Control. Preventing lead poisoning in young children. US Department of Health and Human Services; October 1991.

7. Agency for Toxic Substances and Disease Registry. Toxicological profile for lead. Atlanta: US Department of Health and Human Services; April 1993.

8. Agency for Toxic Substances and Disease Registry. The nature and extent of lead poisoning in children in the United States: a report to Congress. Atlanta: US Department of Health and Human Services; 1988.

9. Agency for Toxic Substances and Disease Registry (ATSDR). Analysis paper: Impact of lead-contaminated soil on public health. US Department of Health and Human Services; May 1992.

10. Society for Environmental Geochemistry and Health. 1993. Lead in soil, recommended guidelines. Science Reviews.

11. US Environmental Protection Agency (USEPA). Memorandum from Mark Maddaloni, chair technical review workgroup adult lead subgroup to Pat Van Leeuwen, region 5 superfund program use of the technical review workgroup Interim Adult Lead Methodology in Risk Assessment, April 1999.

12. U.S. Environmental Protection Agency. Revised interim soil lead guidance for CERCLA Sites and RCRA corrective action facilities. Office of Solid Waste and Emergency Response (OSWER) Directive # 9355.4-12. Washington, D.C. US Environmental Protection Agency; August 1994.

13. U.S. Environmental Protection Agency. Clarification to the 1994 Revised interim soil lead guidance for CERCLA sites and RCRA corrective action facilities. Office of Solid Waste and Emergency Response (OSWER) Directive # 9200.4-27P. Washington, D.C. US Environmental Protection Agency; August 1998.

14. U.S. Environmental Protection Agency. Integrated risk information system. Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office. Cincinnati, OH: US Environmental Protection Agency; 1999.

15. Agency for Toxic Substances and Disease Registry. Toxicological profile for arsenic. Atlanta: US Department of Health and Human Services; April 1993.

16. Tseng WP, Chu H, How S, Fong J, Lin C, Yeh S. 1968. Prevalence of skin cancer in an endemic area of chronic arsenism in Taiwan. J. Natl. Cancer Inst 40:453–463.

17. Agency for Toxic Substances and Disease Registry. Health assessment guidance manual Chapter 5, Table 5.1. ATSDR1.atsdr.cdc.gov:8080/HAC/HAGM/t51.html.

Table 1. Soil Sampling Results - El Paso, Texas - July, 2001				
Sample Location	**Arsenic (mg/kg) (0 to 1")**		**Lead (mg/kg) (0 to 1")**	
	Not sieved	**No. 60 sieved**	**Not sieved**	**No. 60 sieved**
El Paso Parks				
San Jacinto Plaza Park	2.76	3.26	15.0	20.7
Mundy Park	6.84	8.03	91.0	118.0
Houston Square Park	7.43	6.43	42.2	46.4
Tula Irrobali Park	5.92	6.37	46.2	71.9
Chihuahuita Park	7.30	5.74	69.9	57.0
Marcos B. Armijo Park	3.30	4.97	11.6	20.0
Paseo de los Heroes Park	9.87	9.56	110.0	115.0
Dunn Park	4.45	6.21	13.0	26.2
Roger Brown Ballfield	6.31	6.39	20.4	18.2
Tom Lea Upper Park	3.89	4.56	9.91	14.1
	8.03	7.25	114.0	117.0
Arroyo Park	24.8	22.8	307.0	301.0
	7.75	9.08	29.5	55.2
	32.9	50.0	410.0	679.0
	17.2	21.6	178.0	222.0
	26.1	34.1	203.0	304.0
	23.0	28.6	161.0	322.0
	24.1	26.9	186.0	213.0
	35.7	35.3	493.0	493.0
Madeline Park	5.94	7.58	74.5	107.0
Alethea Park	11.2	15.3	135.0	187.0
	12.6	10.1	218.0	181.0
Mission Hills Park	4.62	5.17	19.6	22.8
	4.76	6.18	19.6	26.6
Doniphan Park	31.8	32.6	562.0	538.0

Table 1. Soil Sampling Results - El Paso, Texas - July, 2001

Sample Location	Arsenic (mg/kg) (0 to 1")		Lead (mg/kg) (0 to 1")	
	Not sieved	No. 60 sieved	Not sieved	No. 60 sieved
El Paso Library	23.2	22.0	334.0	454.0
Cleveland Park	15.3	13.8	388.0	350.0
Galatzan Park/Rec Ctr.	4.03	3.73	13.8	11.3
	4.07	4.00	19.1	20.0
Crestmont Park	4.35	4.03	6.36	6.38
Pacific Park	5.54	6.54	45.9	54.4
Buena Vista Park	6.53	7.71	19.1	25.7
El Paso Schools				
Mesita Elementary	4.45	4.52	15.2	6.95
	21.9	26.8	107.0	145.0
	10.6	10.4	59.6	62.2
	7.76	6.97	27.1	30.4
Vilas Elementary	5.10	6.12	12.6	16.1
	21.2	14.3	490.0	254.0
El Paso High	6.14	21.7	7.26	26.7
	7.30	6.81	2,020	333.0
Lamar High School	3.07	3.27	5.49	6.66
	5.85	7.59	29.3	35.6
Wiggs Middle	6.31	6.45	13.4	15.7
	4.33	4.93	11.3	14.0
Alamo Elementary	14.1	17.3	328.0	440.0
	4.57	3.68	36.7	26.7
Roosevelt Elementary	56.9	30.5	430.0	433.0
	11.6	7.46	90.5	79.1
Hart Elementary	12.6	11.9	205.0	236.0
	5.50	5.15	28.9	50.7
Guillen Middle	12.9	10.7	91.1	85.4
	10.2	10.7	71.5	132.0
Carlos Cordova Middle	4.97	4.41	26.1	16.6
	9.82	8.72	17.2	20.0
Highland Annex Elem.	3.21	4.52	13.2	32.4
	4.72	4.39	12.3	9.06

Table 1. Soil Sampling Results - El Paso, Texas - July, 2001

Sample Location	Arsenic (mg/kg) (0 to 1")		Lead (mg/kg) (0 to 1")	
	Not sieved	No. 60 sieved	Not sieved	No. 60 sieved
Moreno Elementary	5.65	5.38	8.66	7.55
	3.60	3.96	4.74	5.81
Houston Elementary	7.15	7.54	21.3	26.0
	4.77	6.36	14.7	23.6
Beall Elementary	3.14	4.13	8.60	17.3
	7.16	8.25	15.7	22.1
Douglas Elementary	3.78	4.10	17.6	28.2
	3.43	4.41	13.2	23.4
Dr. Green Elementary	2.13	3.98	3.58	4.00
	2.99	2.74	4.43	4.68
Morehead Middle	4.87	6.76	19.0	33.6
	4.06	4.15	4.67	5.40
Johnson Elementary	3.84	3.34	20.8	7.76
	4.70	3.88	7.03	6.29

Table 2. Soil Sampling Results - University of Texas at El Paso, Texas . July, 2001				
Sample Location	**Arsenic (mg/kg) (0 to 1")**		**Lead (mg/kg) (0 to 1")**	
	Not sieved	**No. 60 sieved**	**Not sieved**	**No. 60 sieved**
University of Texas at El Paso				
TNRCC Air Monitoring Site	84.7	138.0	5,260	2,000
Biology Bldg. Lawn	5.80	7.71	88.1	167.0
Liberal Arts Bldg. Lawn	16.6	15.6	253.0	243.0
Arroyo east of Union Bldg.	17.6	28.5	121.0	239.0
Memorial Triangle	52.6	49.1	1,230	1,210
Leech Grove	37.9	58.0	501.0	775.0
Union Lawn	54.9	57.4	1,630	1,630
Northeast of Educ. Bldg.	29.5	50.3	282.0	477.0
Practice Field	3.65	3.22	16.0	13.9
Soccer Field Swim/Fit Ctr.	78.2	122.0	656.0	977.0
Miscellaneous Sample Locations				
End of Westway Drive	5.86	6.03	27.8	29.2
Trans Mountain Road	7.91	6.56	39.6	50.0
End of Westway Drive	7.10	14.3	6.49	13.9
Trans Mountain Road	8.77	7.48	22.0	27.3

Table 3. Soil Sampling Results - Sunland Park, New Mexico. July, 2001				
Sample Location	**Arsenic (mg/kg) (0 to 1")**		**Lead (mg/kg) (0 to 1")**	
	Not sieved	**No. 60 sieved**	**Not sieved**	**No. 60 sieved**
New Mexico Parks				
City Hall, Sunland Park	2.48	3.10	8.8	11.6
Lleana Park	2.90	3.56	8.39	12.0
Mt Cristo Rey Park	9.28	9.30	63.1	67.9
	99.8	128.0	670.0	837.0
	7.83	7.82	42.0	52.1
Red Mender Park	3.42	3.53	9.73	9.52
Levee Park	15.8	15.4	32.0	32.7
	5.71	6.40	15.8	17.1
Riverside Park	2.24	2.70	6.80	7.95
New Mexico Schools				
Desert View Elementary	2.43	3.05	3.29	5.26
	2.26	3.60	4.66	9.13
Riverside Elementary	3.89	4.09	13.4	14.3
	3.19	4.21	8.25	12.4
Olga Kohlberg Elementary	6.16	7.34	3.77	2.65
Miscellaneous Sampling Locations				
Water tank at Meadow Vista	5.09	6.65	19.3	24.4
Water tank at McNutt and Racetrack	172.0	197.0	1,070	1,210

Table 4. Air Sampling Results - El Paso / Sunland Park, July, 2001			
Contaminant	**Concentration (:g/m^3) (Min. - Max.)**	**Screening Value (:g/m^3)**	**Basis for Screening Level**
Lead	0.0063 - 0.628	1.5	NAAQS[1]
Arsenic	0.0009 - 0.0079	0.01	TNRCC ESL[2]
Barium	0.0340 - 0.0628	0.5	TNRCC ESL
Cadmium	0.0045 - 0.0046	0.01	TNRCC ESL
Chromium	0.0091 - 0.0126	0.1	TNRCC ESL
Selenium	0.0011	0.2	TNRCC ESL

[1] National Ambient Air Quality Standard

[2] Texas Natural Resource Conservation Commission Chronic Effects Screening Level - ESLs are contaminant concentrations below which adverse health effects would not be expected.

PREPARERS OF THE REPORT

John F. Villanacci, Ph.D.
Co-Director
Environmental Epidemiology and Toxicology Division

ATSDR REGIONAL REPRESENTATIVE

Jennifer Lyke
Regional Representative
ATSDR - Region 6

George Pettigrew, PE
Senior Regional representative
ATSDR - Region 6

ATSDR TECHNICAL PROJECT OFFICER

Alan W. Yarbrough
Environmental Health Scientist
Division of Health Assessment and Consultation
Superfund Site Assessment Branch
State Programs Section

CERTIFICATION

This health consultation was prepared by the Texas Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was initiated.

Technical Project Officer, SPS, SSAB, DHAC, ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation and concurs with its findings.

Chief, State Programs Section, SSAB, DHAC, ATSDR

Figure 1
Lead Surface Soil (0 to 1 inch) Sample Results
Comparison Between Unsieved and #60 Sieved Samples (Outliers Removed)

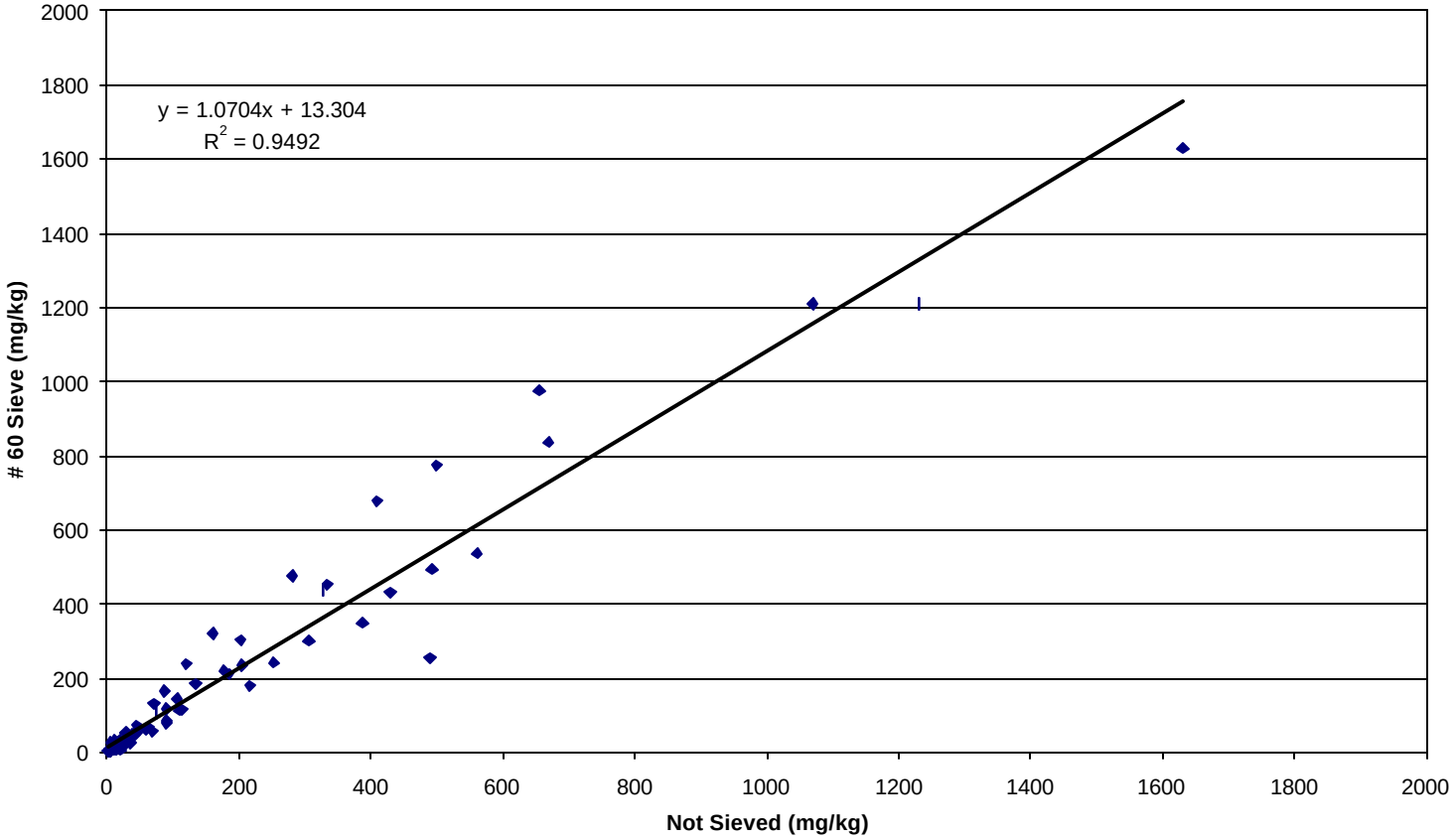

Figure 2
Arsenic Surface Soil (0 to 1 inch) Sample Results
Comparison Between Unsieved and #60 Sieved Samples